Liver and Diabetes: Molecular and Clinical Outcomes

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Abstract

This study is a follow of our previous studies in which we have shown that diabetes is a result of stress. Here, we may use the term "general pooling stress" instead of metabolic syndrome as will be demonstrated in following sections. The present study showed that diabetes type 1 has impacts on liver of diabetic rats through the induction of molecular changes through up-regulation of HSP90 and down-regulation of HSP70.

Actually, our data support the idea of autoimmunity involvement in the pathogenesis of type 1 diabetes. Furthermore, when liver pathology is not addressed in diabetic cases, the chance to identify therapeutic targets is likely to be lacked.

Conclusions: liver plays a vital role in the development and pathogenesis of diabetes type1 and its therapeutic involvement is likely to improve the status of patients with this type of disease. Our results may form novel future research lines, particularly molecular therapeutic strategies.

Keywords: Diabetes type 1; Stress proteins; HSP70; HSP90; Up-regulation; Down-regulation

Introduction

This study involves philosophical and scientific approaches at the same time. From a philosophical point of view, the concept of total daily life philosophy has been introduced by the authors [1]. It implies the involvement of various philosophical approaches in treating different topics among which is diabetes. In this study, the impacts of diabetes type 1 were studied in liver [2].

Liver has a classical role in diabetes such as the involvement of lipid and its role in induction of diabetes [3]. Furthermore, it has been shown that the accumulation of lipid is associated with insulin resistance. It has also been shown that liver is insulin resistant [4-6].

About to Study

We have conducted several studies using animal models (rats) to have a fresh look into diabetes. We have found that there is an axis between brain and other organs leading to increased impacts of diabetes in other organs. In other words, we have checked the possibility that diabetes may exceed the limits of being metabolic disease to neurologic disease [7].

Our previous studies showed that white matter has a major role in diabetes and diabetic neuropathies. The pathologic alterations were detected by immunohistochemistry at early stage of diabetes initiation. We found that down-regulation of HSP70 in white matter, and up-regulation of inducible nitric oxide synthase (iNOS). This means that diabetes is accelerated through this molecular mechanism in which defense mechanisms are altered [8,9].

We have recently examined the possibility of involvement of liver of diabetic rats by similar molecular mechanisms. We studied the expression and localization of two HSP70 and HSP90 in the liver of diabetic and control groups. We found similar patterns of immunological reactivity in liver. First of all, the expression of HSP90 was significantly up-regulated in liver cells compared with that in control group, while HSP70 was significantly down-regulated in liver cells compared with that in control group. We also found that vascular system was also affected by the same patterns of immunological reactivity of both HSP70 and HSP90.

These results stimulated me to ask the following question: Is diabetes an inflammatory disease?

This is a big question and should be addressed in future research.
Conclusion

The present study showed a central role of liver in the pathogenesis of diabetes, and any therapeutic intervention for diabetes should take the molecular impacts on liver into account even before developing full episodes of diabetes.

References